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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,704	01/31/2001	Daniel O. Jones	PLUG-0056-US (734)	7911

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Fred G. Pruner, Jr.
TROP, PRUNER & HU, P.C.
Ste, 100
8554 Katy Freeway
Houston, TX 77024

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 02/03/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-8

Office Action Summary	Application No.	Applicant(s)	
	09/773,704	JONES ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 01/04/03 is: a) ☒ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This communication is responsive to the amendment filed on 01/04/03. The applicants have overcome the objections, and the 35 USC 112 rejection. However, the 35 USC 103 rejection still stands for the reasons of record. Thus, the instant claims (including newly added claim 19) are finally rejected.

Election/Restrictions

1. Applicant's cancellation of claims 9-18 in Paper No. 5 is acknowledged.

Drawings

2. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 01/04/03 has been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Objections

3. Claim 1 is objected to because of the following informalities: the recitation "A method usable with a fuel cell stack" should be changed to "A method of operating a fuel cell stack", or "A method for operating a fuel cell stack" or the like, so as to have a better understanding of scope of the instant invention. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-8 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claims 1-2 recite the limitation "some of the power being consumed" in claim 1 (lines 2-3); "some of the power produced" in claim 1 (lines 5-6), claim 2 (lines 2-3) and claim 19 (line 2). There is insufficient antecedent basis for this limitation in the claim. a) It is noted that claim 1 also recites "the power produced", and "the power consumed", thereby is unclear as to what particular "power" the instant claims are intended to recite; b) furthermore, it is also uncertain as what particular degree or magnitude of power consumed or produced the instant claims are also intended to recite. That is, it is not clear whether the limitation "some of the power consumed/produced" do make reference to "the power consumed/produced" on a 100 % percent basis, or they are merely intended to recite any amount of power regardless the overall energy balance of the system. Further clarification is required.

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
8. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonnefoy 5714874 in view of the European publication EP 782209.

Art Unit: 1745

Regarding claims 1, 3-4:

Bonnefoy discloses a fuel cell voltage generator wherein the voltage generator is to be connected to a current load; a fuel cell for generating electrical energy to be used by the current load; a storage battery having and control means for modifying a maximum intensity value of the current flowing through the dc converter in accordance with a voltage measured at the terminals of the fuel cell to keep said voltage within a predetermined range, at which a power output of the fuel cell is maximum (claims 1, 2, 5-6). It is further disclosed that if the load requires an electric power lower than the one available at the fuel cell, the battery takes profit from the excess of the electric energy (col 2, lines 58-60). It is also disclosed that this invention aims at supplying a voltage generator in which the fuel cell is kept continuously in optimal working conditions, regardless of the load demand, the fuel cell supplies continuously a maximum electric power (col 1, lines 35-40). *Since Bonnefoy teaches the working principle of the fuel cell generator, his teachings thus encompasses the operating method.*

It is further disclosed that the control block is divided in two parts, a first part, grouping all the means necessary for the working control of the fuel cell such as hydrogen supply (mass of fuel), its temperature control and etc, and comprising the control means of the converter (col 2, lines 40-45). It is further taught that as the fuel cell begins to generate enough electric power, it replaces progressively the battery so as to become the only energy source of the generator, it then also supplies the control block (col 2, lines 54-57).

As to claim 6-7:

It is disclosed that the control means includes means for measuring the voltage at the terminals of the fuel cell, and wherein the control means respectively increments and decrements

Art Unit: 1745

the maximum intensity value of the current following through the dc converter when the voltage measured of the fuel cell is above and below said predetermined range; wherein said predetermined range corresponds to a voltage range at which a power output of the fuel cell is maximum (claims 3-4). It is also made known that, in practice, the reference value of the voltage at the fuel cell is determined as being the point of the voltage/current characteristic of the fuel cell corresponding to a maximum power output in normal working conditions of the fuel cell (col 1, lines 59-63).

Bonnefoy discloses a fuel cell voltage generator according to the foregoing. However, Bonnefoy does not expressly selectively routing some of the power produced by the fuel cell stack and not consumed by the first load to the second load.

As for claims 1 and 2:

The EP'209 publication teaches a supply system with fuel cells and a buffer in which the fuel cell has an output voltage lower than the voltage of the buffer battery (claim 2). It is also disclosed that this enable the power delivered by the fuel cells to the load to be controlled simply, precisely and effectively without need to control the voltage output in any way in order to adjust it to the voltage actually present at the terminals of the battery and to the load requirement (page 4, lines 18-23). It is further taught that since the voltage pulses applied to the primary cannot exceed the minimum voltage output by the fuel cell and the maximum battery voltage is greater, it is necessary that the ratio between the maximum battery voltage and the minimum voltage delivered by the fuel cell is preferably of the order to twice the ratio between the mean value of the battery voltage and the mean value of the voltage delivered by the fuel cells. (page 4, lines 24-29).

Art Unit: 1745

As to claims 5 and 7:

It is also disclosed that for power values greater than a specific maximum power that can be delivered by the fuel cell power, the power delivered by the fuel cell is kept constant and equal to the specific maximum power so as to make a maximum contribution to the load requirement. For load power less than the specific maximum, the power delivered by the fuel cell is made to depend upon the charge state of the battery; in particular, if the battery voltage indicates a fully charged condition, the power delivered by the cell is equal to the load power; if the battery voltage is lower than thus indicates a partial charge condition, the regulation band is proportional and is displaced in accordance with the lower voltage so as to deliver a recharging power to the battery (page 6, lines 19-35). The portions of the regulation characteristics which are disposed indicate that the power for recharging the battery is the accumulation of a negative load power (recovered from the load) and a power delivered by the fuel cell, which vary inversely maintaining a predetermined and constant recharging power which depends upon the battery voltage and hence upon its charge condition (page 6, lines 30-35).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to selectively routing some of the power produced by the fuel cell stack and not consumed by the first load to the second load of Bonnefoy as the EP'209 publication discloses that this enable the power delivered by the fuel cells to the load to be controlled simply, precisely and effectively without need to control the voltage output in any way in order to adjust it to the voltage actually present at the terminals of the battery and to the load requirement. Accordingly, it solves a technical problem and provides a supply system with fuel cells and a buffer battery in which a highly efficient, very safe and extremely simply

Art Unit: 1745

electronic regulation system forms the interface and ensures optimal performance of the drive system, particularly, it limits the current of the fuel cells to a maximum permitted design value; it regulates the power delivered by the fuel cells in dependence on the charge state of the batteries and on the power required by the load; it limits the rate of increase of the power delivered by the cells to permissible values; and it adjusts the voltage output by the fuel cells to a higher battery voltage.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bonnefoy 5714874 in view of the European publication EP 782209 as applied to claim 1 above, and further in view of Hauer 6214484.

Bonnefoy and the EP'209 publication are applied, argued and incorporated herein for the reasons above. In addition, the foregoing prior art fails to disclose the fuel processor to provide the fuel flow.

Hauer teaches a fuel cell arrangement having a fuel cell stack, a methanol reformer (fuel processor) wherein the fuel cell stack is connected with an electrical energy storage device (abstract).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use a fuel processor (reformer) to provide fuel to the fuel cell method of Bonnefoy and the EP'209 publication as Hauer teaches that the fuel processor converts raw fuel into reformed hydrogen which is the specific fuel employed to generate electrical energy from a fuel cell system. As it is conventionally known in the art, very efficient fuel cells use pure hydrogen for fuel; and pure hydrogen, has traditionally been difficult to handle and relatively

expensive to store and distribute. Consequently, fuel processors process and provide the required hydrogen rich gas mixtures from reforming of various hydrocarbons fuels which are expected to be utilized in fuel cell systems.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bonnefoy 5714874 in view of the European publication EP 782209 as applied to claim 1 above, and further in view of Singh et al US2002/0076588.

Bonnefoy and the EP'209 publication are applied, argued and incorporated herein for the reasons above. In addition, the foregoing prior art fails to disclose routing some power to an oxidizer.

Singh et al disclose a fuel cell system providing means for oxidizing heated reformed fuel gas in fuel cell during transient load conditions (section 0009). It is disclosed that the electrical storage device is capable of electrochemically oxidizing a quantity of reformer gas contained within an anode chamber of the fuel cell during transient load conditions by charging from a preset state of charge towards full capacity (abstract).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to route power to an oxidizer in fuel cell system of Bonnefoy and the EP'209 publication as taught by Singh et al as it is apparent that the routed power is to operate the means for oxidizing during transient load conditions that prevent transient increases in the combustion anode gas during changes in electrical load demand. Accordingly, the energy storage device thereby prevents large quantities of unoxidized reformer gas from entering a chamber of a combustor during transient load conditions, unoxidized reformer gas that generates tremendous

Art Unit: 1745

amount of heat when burned that can corrode or damage the combustor. Thus, the energy storage device discharges the excess charge when the fuel cell power generation system returns to normal load conditions or during transient load conditions when the amount of reformer gas entering the anode chamber has been reduced so that the amount of unoxidized reformer gas entering the combustor is maintained at nearly constant level.

Response to Arguments

11. Applicant's arguments filed 01/04/03 have been fully considered but they are not persuasive. The main contention of applicants' argument is premised on the assertion that the prior art fails to teach the step of "determining whether to route at least some of the power". In that, applicants further argued that the prior art only discloses "automatically routing electric power". However, this assertion is not sufficient to overcome the rejection. *In this regard, the examiner likes to contend that while the term "automatically" might imply that it is acting or done spontaneously, such term "automatically", for instance, also implies having a self-acting or self-regulated mechanism. That is to say, a state or condition in which activity or behavior (of system) is regulated automatically in a predetermined manner.* Accordingly, it is understood that while the method of the prior art can be performing steps automatically, there must exist a discriminating sequence (order), or operational subroutine or programmable succession in which such steps are strictly required to be performed based on pre-set operating conditions which are necessitated as to obtaining a continuing, adequate and satisfactory fuel cell functionality without affecting the overall system performance, and inherently, its method of operation. Hence, the automatic step of the prior art inherently includes determining or

discriminating steps and/or conditions. Thus, the burden is shifted to applicants to provide objective evidence demonstrating the claimed method is necessarily different from the prior art's method, and that the difference is unobvious.

12. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, both references are directed to method of operating fuel cell system exhibiting changeable load conditions.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action, in particular, for claim 19. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 1745

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's primary examiner, Steve Kalafut can be reached on (703) 308-0433. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745



RECEIVED
PRIMARY EXAMINER
GROUP 1700